AMENDMENTS TO THE CLAIMS

Kindly amend claims, as shown in the listing of claims below. This listing of claims will replace all prior versions, and listings of claims in the application.

1. (original) A nanostructured apparatus, comprising:
a mesoporous template having a network of regularly-spaced pores, wherein a characteristic dimension of the pores is between about 1 nm and about 100 nm; and
a layer of material that substantially coats one or more walls of the pores to a substantially uniform thickness.

2. (original) The apparatus of claim 1 wherein the pores include one or more sets of substantially straight and parallel pores.

3. (original) The apparatus of claim 2 wherein the pores include first and second sets of substantially straight and parallel intersecting pores, wherein the pores in the first set run substantially perpendicular to the pores in the second set.

4. (original) The apparatus of claim 3 wherein the layer of material coats the walls of the pores in both sets in a substantially uniform fashion.

5. (original) The apparatus of claim 3 further comprising a third set of substantially straight and parallel pores that intersect the pores in the first and/or second sets, wherein the pores in the third set run substantially perpendicular to the pores in the first and second sets.

6. (original) The apparatus of claim 5 wherein the layer of material coats the walls of the pores in all three sets in a substantially uniform fashion.

7. (original) The apparatus of claim 1 wherein the material is a first semiconductor material.

8. (original) The apparatus of claim 1, further comprising a second semiconductor material disposed within one or more of the pores, wherein the first and second semiconductor materials have complementary charge transfer properties.

9. (original) The apparatus of claim 1, wherein the mesoporous template is made from an insulating material.

10. (original) The apparatus of claim 9 wherein the insulating material is silica (SiO_2).

11. (original) The apparatus of claim 1 wherein the mesoporous template is made from a semiconducting material.

12. (original) The apparatus of claim 1 wherein the layer of material includes one or more reactant materials, catalyst materials, light absorbing materials or semiconducting materials.

13. (original) The apparatus of claim 12 wherein the layer of material includes a first semiconducting material.

14. (original) The apparatus of claim 13 further comprising a second semiconductor material disposed on the first semiconductor material, wherein the first and second semiconductor materials have complementary charge transfer properties.

15. (original) The apparatus of claim 14 wherein at least one of the first and second semiconductor materials is a light absorbing material.

16. (original) The apparatus of claim 14 wherein one of the first and second semiconductor materials is an organic material.

17. (original) The apparatus of claim 1 wherein the layer of material has been deposited by atomic layer deposition.

18. (original) The apparatus of claim 1 wherein the layer of material includes a light-absorbing semiconductor material.

19. (original) The apparatus of claim 1 wherein the layer of material includes a non-reactive metal or metal oxide, that provides an inert surface whereby that apparatus may act as a filter.

20. (original) The apparatus of claim 1 wherein the layer of material includes a reactive metal or metal oxide that provides an inert surface whereby the apparatus may act as a catalyst and/or filter.

21. (original) The apparatus of claim 1 wherein the layer material has optical transmission, reflection, absorption or other properties whereby the apparatus may act as an optical device.

22. (original) The apparatus of claim 21 wherein the optical device is a luminescent, electro-optic, and magneto-optic waveguides, optical filters, optical switches, amplifies, laser diodes, multiplexers, optical couplers.

23. (original) The apparatus of claim 1 wherein the layer of material includes a semiconducting or conducting surface coating that can transmit electrical signals arising from binding of a molecule to the surface coating, whereby the apparatus is a sensor.

24. (original) An optoelectronic device, comprising:
an active layer disposed between a first electrode and a second electrode, wherein the active layer includes a mesoporous template having a network of regularly-spaced pores, wherein a characteristic dimension of the pores is between about 1 nm and about 100 nm; and one or more semiconducting materials that substantially coat one or more interior walls of the pores to a substantially uniform thickness.

25. (original) The device of claim 24 wherein the mesoporous template is made of silica

26. (original) The device of claim 25 wherein the first semiconducting material has been deposited by atomic layer deposition.

27. (original) The device of claim 26, wherein the one or more semiconducting materials include a first semiconducting material and a second semiconducting material, wherein the first and second semiconducting materials have complementary charge transfer properties.

28. (original) The device of claim 24 wherein the semiconducting material is configured such that the device is an LED, laser, or photovoltaic device.

29. (currently amended) A method for making a nanostructured apparatus, comprising:
forming a mesoporous template having a network of regularly-spaced pores, wherein a characteristic dimension of the pores is between about 1 nm and about 100 nm; and

an active material coating one or more interior walls of the pores;

substantially coating one or more walls of the pores with ~~an active~~ a material to a substantially uniform thickness.

30. (original) The method of claim 29 wherein forming a mesoporous template includes disposing a sol on a substrate, wherein the sol includes one or more alkoxides with a central element X, one or more surfactants, one or more condensation inhibitors, water, and a solvent,

evaporating the solvent from the sol to form a surfactant-templated porous film, and

crosslinking the surfactant-templated porous film to form mesoporous template.

31. (currently amended) The method of claim 29 wherein coating one or more walls of the pores with ~~an active~~ a material includes depositing the active material by atomic layer deposition.